ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
AIR PERMITS PROGRAM

TECHNICAL ANALYSIS REPORT

For Air Quality Control Minor Permit No. AQ0290MSS01

Teck Cominco Alaska, Incorporated
Red Dog Mine
Temporary Asphalt Plant Project

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List of Abbreviations Used in this Permit

AAC .....Alaska Administrative Code
ADEC.....Alaska Department of Environmental Conservation
AS .....Alaska Statutes
ASTM .....American Society of Testing and Materials
CEMS.....Continuous Emission Monitoring System
CET .....Cumulative Equivalent Total
C.F.R. .....Code of Federal Regulations
COMS .....Continuous Opacity Monitoring System
EPA .....US Environmental Protection Agency
HAPS .....Hazardous Air Pollutants [hazardous air contaminants as defined in AS 46.14.990(14)]
HHV .....Higher heating value
ID .....Source Identification Number
MACT .....Maximum Achievable Control Technology
NAICS .....North American Industry Classification System
NESHAPs .....Federal National Emission Standards for Hazardous Air Pollutants [as defined in 40 CFR 61]
NSPS .....Federal New Source Performance Standards [as defined in 40 CFR 60]
PS .....Performance specification
PSD .....Prevention of Significant Deterioration
RM .....Reference Method
SIC.....Standard Industrial Classification
GP3 .....the department's Asphalt Plant General Permit

Units

acf.....actual cubic foot
Btu.....British Thermal Unit (1 Btu = 1,055 Joules)
dscf.....dry standard cubic foot
gr. .....grain (1 pound = 7000 grains)
GPH.....gallons per hour
hp.....horsepower (bhp is horsepower at shaft) (1kW = 1,341 hp)
kW.....kilowatts
MM .....million (1 MM Btu = 10^6 Btu)
PPM.....parts per million
PPMV.....parts per million volume
TPH .....tons per hour
TPY .....tons per year
Wt% .....weight percent

Pollutants

CO .....carbon monoxide
HAPS .....Hazardous Air Pollutants [as defined in AS 46.14.990(14)]
H_2S .....hydrogen sulfide
NO_X, NO_2.....oxides of nitrogen, nitrogen dioxide respectively
PM-10 .....particulate matter with aerodynamic diameter less than 10 microns
SO_2 .....sulfur dioxide
VOC .....volatile organic compound [as defined in 18 AAC 50.990(103)]

1.0 Introduction

1.1 Project Description

Teck Comino submitted a minor permit application for a temporary asphalt plant at the Red Dog Mine dated March 23, 2005.

Teck Cominco is planning to pave the runway at the Red Dog mine to allow for more modern aircraft to land. The asphalt plant will be temporarily operated for an equivalent total of 14 days in mid-summer 2005. The portable asphalt plant will be set up near the runway to produce asphalt for this project. For this project, the asphalt plant will produce a total of approximately 40,000 tons of asphalt. Upon completion of the project, 85,000 square yards of gravel runway will be paved.

Teck Cominco selected an asphalt plant from a contactor with an existing Department GP3 permit.

The Department issues this preliminary decision under the authority of AS 46.14 and 18 AAC 50.

The equipment for the temporary asphalt plant is in Table 1.1 below. The asphalt equipment is to be provided by an outside contractor for the estimated four weeks of the project.

Table 1.1 Emission Unit Identification and Description

Emission Unit No.	Equipment Type	Make/Model/ Serial No.	Protential Operation	Maximum Total Throughput or Operation	Max. Rated Capacity orMax. Design Throughput
1	Loader to Cold Aggregate Bin	Not Yet Known	336 hr/yr	38,040 tons of Aggregate	400 tph
2	Cold Aggregate Bin to Conveyor	Not Yet Known	336 hr/yr	38,040 tons of Aggregate	400 tph
3	Conveyor to Rotary Dryer	Not Yet Known	336 hr/yr	38,040 tons of Aggregate	400 tph
4	Rotary Dryer, Hot Screens and Mixer	Not Yet Known	336 hr/yr	40,000 tons of Asphalt	400 tph
5	Truck Load-out	Not Yet Known	336 hr/yr	40,000 tons of Asphalt	400 tph
6	Asphalt Cement Heater	Not Yet Known	336 hr/yr	336 hours	1.5 MMBtu/hr
7	Generator	Not Yet Known	336 hr/yr	336 hours	1000 kW
8	Aggregate Storage Piles	Not Yet Known	336 hr/yr	336 hours	400 tph

1.2 Emission Summary

There are no emission increases from the existing sources from Operating Permit No. 290TVP01. Emission increases are from the temporary asphalt equipment shown in Table 1.2.

Table 1.2 – Temporary Asphalt Plant Potential Emissions

Emission Unit		Potential Emission (tpy)		
ID	Description	NO_X	PM_{10}	SO_2
1	Loader to Aggregate Bin	0.0	0.001	0.0
2	Aggregate Bin to Conveyor	0.0	0.001	0.0
3	Conveyor to Rotary Dryer	0.0	0.001	0.0
4	Dryer, Hot Screens, and Mixer	2.40	0.540	1.8
5	Truck Load-out	0.0	0.010	0.0
6	Asphalt Cement Heater	0.04	0.004	0.0
7	Generator	5.4	0.158	0.3
8	Aggregate Storage Pile	0.0	0.001	0.0
	Total Potential Emissions (tons)	7.8	0.7	2.1

1.3 Stationary Source Description

The temporary asphalt plant will be operated at the Red Dog Mine. The asphalt plant will be at the Mine location, near the existing runway. The Red Dog Mine is an existing mine that currently operates under terms and conditions of AQC Operating Permit No. 290TVP01.

The equipment at the Red Dog Mine includes power generators, portable generators, construction generators, refuse incinerators, heaters, and ore handling equipment, crushers, mill building exhausts and vents systems and storage tanks for petroleum. All of the emission units at Red Dog are permitted.

The Red Dog Mine is located in DeLong Mountains of the Western Brooks Range; approximately 145 kilometers North of Kotzebue near the headwaters of the Wulik River. The mine location is at latitude 68º04' N and longitude 162º50' W. The topography of the area is mountainous with nearby peaks reaching about 3,000 feet above sea level. Base elevation for the mine is approximately 1,000 feet above sea level.

The Red Dog Mine is located in the Northern Alaska Intrastate Air Quality Region. The project is located in an area unclassifiable for ambient Air Quality. Based on monitoring from other remote sites, the department expects the area to be in attainment with Ambient Air Quality Standards.

The nearest PSD Class I area is Denali National Park including the Denali Wilderness but excluding the Denali National Reserve. This Class I area is located approximately 650 km southeast of the Red Dog Mine. Due to the great distances and topography, the stationary source will have negligible impacts on the Class I area. The area is designated as Class II for ambient air quality increments.

1.4 Stationary Source and Minor Permit Classifications

The temporary asphalt plant application is for a minor permit requested under 18 ACC 50.502. The Red Dog Mine is classified as a PSD stationary source. There will be limited and temporary

increases of emissions with this project. However, these increases are not significant modifications and are well below the Potential to Emit limits. The emissions will not result in classification of the Red Dog Mine Temporary Asphalt Plant as prevention of significant deterioration (PSD) major modification under 18 ACC 50.306. The comparison of the Potential to Emit with Actual reported emissions are in Table 1.4 below.

Table 1.4 – Comparison of Potential to Estimated Assessable Emissions

Red Dog Assessable Potential Emissions (from Permit # 290TVP01 Statement of Basis, November 10,2003)				
NO_X	CO	PM-10	VOC (including HAPs)	SO_X
4,021 tpy	371 tpy	346 tpy	230 tpy	243 tpy
Red Dog Assessable Emissions (January-December 2004)				
NO_X	CO	PM-10	VOC (including HAPs)	SO_X
2,817 tpy	221 tpy	227 tpy	156 tpy	125 tpy

1.5 Permit Conditions

18 AAC 50.544(b), the department must include in a permit for operation of an asphalt plant terms and conditions necessary to ensure the project will meet the requirements of the department's air quality permitting statute (AS 46.14) and regulations (18 AAC 50.)

The conditions in the permit include conditions that govern the effect of the permit, and conditions for ensuring compliance with ambient and emissions standards that apply to the project.

2.0 Department Findings

1. Teck Cominco's temporary asphalt plant is below the limit for classification as a PSD major modification.
2. Asphalt plants in Alaska require a permit for operation.
3. To avoid potential fugitive metal emissions, all aggregate for the asphalt plant is required to be obtained from the DD2 pit material source and not from any existing mineralized aggregate from the Red Dog mine or mine tailings.
4. Teck Cominco will be required to conduct the visible emission observations as described in Condition 22 of the GP3 permit.

5. The location for the temporary asphalt plant will be a no less than 1,500 ft to the nearest occupied residential structure or temporary construction camp.
6. Teck Cominco will be required to conduct the periodic source test as described in Condition 16 of the GP3 permit.
7. Teck Cominco will be required to operate the asphalt plant as described in Condition 16 of the GP3 permit.
8. Teck Cominco will be required to operate the asphalt plant as described in Condition 18 (Baghouse) of the GP3 permit.
9. Teck Cominco will be required to operate the asphalt plant as described in Condition 19 (use of scrubbers) of the GP3 permit.
10. Teck Cominco will be required to operate the asphalt plant as described in Condition 20 of the GP3 permit.
11. The Red Dog Mine's fuel burning equipment is subject to the State Air Quality Control Regulations 18 AAC 50.055(a)(1) for visible emissions, 18 AAC 50.055(b)(1) for particulate matter, and 18 AAC 50.055(c) for sulfur compound emissions as specified in Operating Permit No. 290TVP01.
12. The temporary asphalt plant is subject to the State Air Quality Control Regulations 18 AAC 50.055(b)(5) for particulate matter.
13. The fuel for the temporary asphalt plant will have a sulfur content of 0.74 percent sulfur or less by weight. Because the asphalt plant will be within a stationary source that already has limits fuel sulfur for protecting ambient air quality, and no additional ambient air quality analysis was done for this project, the fuel burned in the asphalt plant must also comply with the limits ambient protection fuel sulfur limits in Operating Permit No. 290TVP01.
14. The stationary source is located in a coastal zone district. The project modification would be subject to review under the Alaska Coastal Management Program (ACMP) if coastal impacts increase. Permitted activities are consistent with ACMP when permitted through 18 AAC 50, as provided for in AS 46.40.040(b).
15. Teck Cominco is authorized to a total aggregate/asphalt output of 40,000 tons.

3.0 Emission Standards

For each stationary source or modification subject to minor permitting, the applicant must show that the proposed emissions units comply with state emission standards in 18 AAC 50.050-090.

Industrial processes and fuel-burning equipment at the stationary source are subject to specific visible emission, particulate matter, and sulfur compound emission standards as listed in 18 AAC 50.055. Activities are subject to open burning prohibitions as listed in 18 AAC 50.065, and bulk material activities are subject to fugitive dust prohibitions listed in 18 AAC 50.045(d).

Because the stationary source is subject to Title V permitting, the minor permit must also ensure compliance with federal emissions standards.

3.1.1 Visible Emissions

Asphalt plant equipment authorized under this permit is subject to the 20 percent visible emission standard in 18 AAC 50.055(a)(4).

GP3 requires visible emission observations to be conducted, in accordance with 40 C.F.R. 60, Appendix A, Method 9, within two days of startup at a new location, at least once during a 30-day operating period at the same location, and when an asphalt plant starts up after a shut down period of more than 5 days. The test should occur when the plant is operating at a load typical of the maximum operation during the reporting period. This requirement does not apply to heaters and insignificant sources. Note the equipment production or operating rate at the time of the Method 9 observation. Method 9 consists of at least 24 readings, one reading every 15 seconds.

The Teck Cominco asphalt plant is a temporary operation, however, in effect it is a start-up operation for an asphalt plant. Teck Cominco will be required to conduct visible emission observations as outlined in Condition 22 of the GP3 permit.

3.1.2 Particulate Matter

Asphalt plant equipment authorized under this permit is subject to the particulate matter standard of 0.04 grains per dry standard cubic foot in 18 AAC 50.055(b)(5). However, the nonroad engine that provides power for the asphalt is not subject to stationary source standards.

GP3 requires periodic testing for particulate matter using EPA Method 5 every five years or 7200 Operating hours. The temporary asphalt plant is estimated to operate for 300 hrs for the life of the project, well below the GP3 requirement. Teck Cominco will provide the PM source test as described in condition 16 of GP3 permit.

For Particular Matter control, Teck Cominco will monitor/operate the asphalt plant as described in the conditions 17 -21 of the GP3 permit.

If the asphalt plant has not been shown through source testing to be able to comply with the standard, testing is required as described in 3.1.4. However, the department has record that the Brice asphalt plant selected as of the date of this permit had a source test done in 2003. Since the test was performed in Alaska, the department had the opportunity to witness the source test.

3.1.3 Sulfur Compounds

All fuel-burning equipment is subject to the sulfur compound emission standard as set out in 18 AAC 50.055(c). Sulfur compound emissions from fuel-burning equipment, expressed as SO_2, may not exceed 500 ppm averaged over a period of three hours. Fuel oil having sulfur content of 0.74 percent sulfur by weight or less comply with the state compound emission standard, conservatively assuming the minimum theoretical amount of air required for complete combustion.

Teck Cominco's minor permit application for the asphalt plant have requested no change in the sulfur content of the diesel used for Operating permit 290TVP01. That permit restricts fuel sulfur content to less than 0.74 percent in order to protect ambient air quality standards and increments. This permit refers to the existing operating permit limits.

3.1.4 New Source Performance Standards

The asphalt plant expected to be used is subject to the New Source Performance Standards of 40 C.F.R. 60, Subpart I. Because the stationary source at which this asphalt plant will be operated is a Title V major stationary source, the plant is subject to the NSPS under state regulations. This permit must therefore ensure compliance with the new source performance standard. Therefore, the permit will contain the same provisions for compliance with the NSPS as GP3, which was written as an operating permit including the provisions of Title V. If the initial NSPS performance test has not already been conducted for this asphalt plant, it will be required within 30 days under this permit. However, the department has record of a performance test being conducted for the plant selected as of the issuance date of this permit.

3.1.5 General Air Pollution Prohibited

18 AAC 50.110 and Section 12, "*Generally Applicable Requirements,"* of Operating Permit No. 0290TVP01 state that no person may permit any emission that is injurious to human health or welfare, animal or plant life, or property, or that would unreasonably interfere with the enjoyment of life and property. Under Section 12, condition 55 of Operating Permit No, 0290TVP01, the Permittee is required to initiate corrective action to eliminate any air pollution violation identified. This permit includes the underlying requirement and refers to the monitoring, record keeping, and reporting in the operating permit.

3.1.6 Location to On-Site Housing Facilities

The Personnel Accommodation Complex for the mine is approximately 18,000 feet from the proposed asphalt plant location. The Construction Camp Personnel Accommodation Complex is 1,500 feet from the proposed asphalt plant location. This complex is not in use, has been mothballed, and will not be used during the paving project.

GP 3 permits required sufficient distance from operation for houses, business and other residential structures. Due to the remote location of the Red Dog Mine there is no affected residential area. The residential structures for the housing of construction and mine employees are sufficiently distant from the operation of the asphalt plant. Section 4.0 discusses the basis for considering the distance to worker housing.

3.1.7 Fugitive Dust

Teck Cominco has requested in their application to comply with conditions 19 and 52 of operating Permit No 290TVP01. These conditions refer to specific emission sources so this permit instead refers to the comparable applicable language from GP3.

3.1.8 Lead /Metal Concentrations

To avoid lead or metal concentrates, the aggregate will be sources from on site pit providing DD2 material. No aggregated will be used from the Red Dog Mine rock or tailings. Potential lead emissions are negligible because nonmetallic gravel will be used to produce aggregate for the hot-mix asphalt. As a result, lead containing particulate matter emissions will not result from the project. Table 3.3.7 provides the metal concentrations from the aggregate source pit.

Table 3.3.7 - Metals concentrations for aggregate source DD2

					Depth			
Drill Hole	North	East	Elevation	Sample Number	From	To	Lead (%)	Zinc (%)
G37	5137820	578050	1,074.7	23146	25	30	0	0
G43	5138620	578570	1,027.2	23145	10	15	0	0
G46	5138320	577810	1,142.6	23147	25	30	0	0
G46	5138320	577810	1,145.6	23148	120	125	0	0

4.0 Ambient Air Quality Impact Analysis

Dispersion modeling is not provided because the potential emissions from the asphalt are small, less than the thresholds at 18 AAC 50.502(c)(3), and the asphalt plant will be located more than 1,100 feet from the closest point on the ambient air quality boundary. Based on department dispersion modeling, GP3 allows operation if, in addition to compliance with 18 AAC 50.110, an asphalt plant will be located at more than this distance from a residence or occupied structure. This permit relies on the same dispersion modeling.

However, because there was no additional modeling done, the fuel is limited to the same sulfur concentration as the existing operating permit to account for possible overlapping impacts.

5.0 Permit Administration

5.1 Records and Reports

The department's Title V Team has oversight for all reports, surveillance, records, and inspections of permitted facilities. Therefore, all plans, reports except excess emission reports, and notices required under this permit should be submitted to the Title V Team's Fairbanks Office, as provided for in Section 14 "General Recordkeeping, Reporting, and Compliance Certification Requirements," of Operating Permit No. 290TVP01.

5.2 Project Consistency with ACMP

The stationary source is located in a coastal district, and may affect the coastal resources. The applicant submitted a coastal project questionnaire (CPQ) as part of the permit application. The stationary source has previously been found consistent with the ACMP. The proposal is a project modification under ACMP. The Department distributed the CPQ for this project modification to agency review participants. The participants have not requested additional project ACMP review for this project modification under 6 AAC 50.810. The permitted activities have been found consistent with ACMP through AS 46.40.040(b).

Appendix A

Compliance Demonstrations

Visible Emission Standard – 18 AAC 50.055(a)(4)

The asphalt plant, including all fired equipment, is subject to 18 AAC 50.055(a) (4). Although visibility information is not available at this time on the specific asphalt plant that will be utilized at the Red Dog mine, experience has shown that asphalt plants are capable of compliance with this standard when asphalt plant equipment is properly operated and maintained. The contract will require that the selected asphalt plant be compliant with 18 AAC 50.055(a)(4).

Particulate Matter Grain Loading Standard - 18 AAC 50.055(b)(5)

The asphalt plant is subject to the grain loading standard of 18 AAC 50.055(b)(5). The selected asphalt plant be compliant with 18 AAC 50.055(b)(5). The ability to comply depends on the correct matching of process and control equipment. The initial NSPS performance test serves to demonstrate whether the equipment is capable of complying. Therefore, the unit selected must either have passed a performance test within the last 5 years or perform one within the first 30 days of operation under this permit.

Sulfur Dioxide Exhaust Concentration - 18 AAC 50.055(c)

Source: Diesel-Fired Equipment

- From 40 CFR 60, Method 19,

  F-factor for diesel fuel = 9,190 scf/MMBtu
  1 ppm SO_2 = 1.660E-7 lb SO_2/scf (conversion factor)

- Converting ppm SO_2 in stack gas to wt. pct. S in fuel

  (500 ppmv SO_2)(1.667E-7) = 8.3E-5 lb SO_2/scf

  (8.3E-5 lb SO_2/scf)(9,190 scf/MMBtu fuel)(.0193 MMBtu/lb fuel)

  = 1.48E-2 lb SO_2/lb fuel

  (1.48E-2 lb SO_2/lb fuel)(mole SO_2/64 lb SO_2)(mole S/mole SO_2)(32 lb S/mole S)

  = .0074 lb S/lb fuel

  = 0.74 wt. pct. S

- Therefore, if fuel sulfur is less than 0.74 wt. pct., resulting SO_2 stack concentration is less than 500 ppm.

- Assumptions/Comments

  Calculation conservatively assumes that no excess air is present in stack gas even though diesel-fired equipment is operated with excess air (measured as O_2) in the stack gas as a requirement for good combustion.